In the sentence bridging pages 9 and 10, the Applicant indisputably disclosed, (and in fact earlier claimed), the broad limitation that the amount of hydrophilic comonomer in the linear random copolymer was "preferably less than about 10 mole%." This range obviously includes the now narrower claimed range that the linear random copolymer is less than about 10 mole% and greater than or equal to about 1 mole%. Notably, this amendment was provoked by the Examiner's examination of the claims assuming no hydrophilic comonomer was present, ie. assuming 0%. Perhaps the Examiner would have preferred the Applicant to have amended the claim to recite "at least some" hydrophilic comonomer?

In any event, plainly the Applicant was in possession of the range taught and claimed in the original filing. In addition to the broader range, the Applicant further provided an example wherein the preferred range was between 1 mole% and about 2.5% (see page 10, line 5). Despite the fact that the amendment only serves to narrow the more general range, the Examiner now asserts that a *narrower* limit cannot be applied to the broader disclosure. This argument is sophistry. If a specific embodiment of the claimed invention explicitly utilizes a lower limit *falling within the claimed range of the broader disclosure*, how can the Applicant *not* have been in "possession" of this limitation, which only serves to *narrow* the broader disclosure? Stated differently, how could the Applicant possibly have been in possession of the range from 0 to 10 without also having been in possession of the range from 1 to 10, particularly when the Applicant provided a specific example having a preferred lower limit 1? If the Examiner wishes to require the Applicant to amend the specification to recite this range, the Applicant is happy to do so, and would have no objection to the Examiner doing so by Examiner's amendment. However, there can be no doubt that the Applicant was "in possession" of a range *narrower* than that which was originally claimed, and any assertion that such is "new matter" is a logical impossibility. Since "an applicant is entitled to claims as broad as the prior art and his disclosure will allow" In re Rasmussen, 650 F.2d 1212, 211 USPQ 323, 326 (C.C.P.A. 1981), the Applicant respectfully requests that the Examiner withdraw this objection.

The Examiner has also apparently withdrawn his rejections under 35 USC 112, second paragraph, The Applicant appreciates the Examiner's withdrawal of this rejection.

35 USC 102 (b) and 35 USC 103 (a)

The Examiner has continued to reject claims 1, 2, 4 and 9 under 35 USC 102(b) as being anticipated by, or in the alternative, under 35 USC 103(a) as obvious over Sassi et al. (USP 5,631,337). In responding to the Applicant's arguments distinguishing the pending claims from Sassi, the Examiner asserts that Sassi's polymers are copolymers and acrylamide as used by Sassi is hydrophilic. The Examiner might be surprised to learn that Applicant agrees.

In fact, as the Applicant previously pointed out, in Sassi, gellation occurs as a result of the formation of hydrogen bonds by this hydrophilic acrylamide brought about by cooling (see claim 1). This is why Sassi requires the weight percent ratio of Sassi's acrylamide monomeric units to the copolymer comprising N-substituent groups capable of hydrogen bonding range from about 55:45 to 95:5, and will usually range from about 65:35 to 90:10 (see column 3, lines 6-10). Sassi needs a lot of acrylamide to form sufficient hydrogen bonds to form a gel.

As the Applicant previsouly pointed out, the gellation of the Sassi polymers utilize the exact opposite mechanism of the carriers claimed by the Applicant. Sassi uses the formation of hydrogen bonds by this hydrophilic acrylamide to form a gel when cooled. The carriers claimed by the Applicant are hydrogen bonded to water in a non-gelled state, and then when heated, the hydrogen bonds are disrupted, and the N-isopropyl groups form a gel by hydrophobic interactions. In other words, Sassi forms a gel by forming hydrogen bonds, and the Applicant forms a gel by breaking hydrogen bonds.

This is why the Applicant limits the amount of hydrophilic comonomer in the linear random copolymer to less than about 10 mole%, far less than the range taught by Sassi. If the Applicant has too much hydrophilic comonomer, for example, if the Applicant had as much as required by Sassi, the Applicant's gels

wouldn't work. Thus, the Applicant's gels are readily distinguished from Sassi because the Applicant's gels operate with vastly different proportions of the hydrophilic comonomer. This alone is sufficient to distinguish the Applicant's gels from Sassi under 35 USC 102 or 103. Still, to drive the point even further home, the Applicant has further amended the claims to require that the Applicant's gels form upon heating, whereas Sassi's form upon cooling. The Applicant respectfully requests that the Examiner remove the rejection based upon Sassi.

The Examiner has persisted in rejected claims 1-9 and 12 under 35 USC 102(b) as being anticipated by, or in the alternative, under 35 USC 103(a) as obvious over Bae et al. (USP 5,262,055). In making this rejection, the Examiner has made a fundamental error with regard to the presently claimed invention. The Examiner has assumed that all combinations of N-alkyl substituted [meth-]acrylamide derivitives and hydrophilic comonomers will form gels with substantially no synerisis. This assumption is false, as evidenced by the Bae disclosure itself. In fact, one can readily combine N-alkyl substituted [meth-]acrylamide derivitives and hydrophilic comonomers in a manner that will fail to form gels, and in a manner that will form gels, but gels with substantial synerisis. The Applicant makes no claims to such combinations.

Accordingly, the Applicant has limited his claims to only that subgroup of N-alkyl substituted [meth-]acrylamide derivitives and hydrophilic comonomers that will form gels with substantially no synerisis. This type of claim limitation, describing what the thing does, rather than what it is, in entirely proper, and is entitled to the full weight afforded any other claim limitation in the examination of the patent. As stated by the CCPA:

> We take the characterization "functional," as used by the Patent Office and argued by the parties, to indicate nothing more than the fact that an attempt is being made to define something (in this case a composition) by what it *does* rather than by what it *is* (as evidenced by specific structure or material, for example). In our view, there is nothing intrinsically wrong with the use of such a technique in drafting patent claims. Indeed we have

even recognized in the past the practical *necessity* of the use of functional language. *In re* Swinehart, 439 F.2d 210, 169 USPQ 226-29 (C.C.P.A. 1971) (footnote omitted).

Thus, with respect to Bae et al., the question is, does the composition referenced by the Examiner (example 2 of Bae et al.) have the functional properties recited by the Applicant? Certainly Bae makes no such claim. The Examiner also has no idea; he has simply assumed that it does. However, this assumption flies in the face of the specific disclosure by Bae. The Examiner's attention is again drawn to the fact that synerisis of the polymer in the Bae disclosure is explicit. At column 10, lines 41-50, Bae explicitly discloses

> This suspension will be injected... and the polymer **14** will collapse... as the temperature is raised to or above the LCST. Decreasing the temperature will solubilize the collapsed matrix.

Admittedly, Bae discloses such an overwhelming range of potential materials (see the paragraph bridging columns 8 and 9) that some combination of those materials, in the right proportions, *might* result in a gel having the Applicant's claimed properties. However, Bae does not remotely suggest the desirability of creating such a gel (having no synerisis), nor does Bae remotely suggest that any such gels are even possible. As pointed out by the Applicant, in the single instance wherein Bae does discuss the functional property the Applicant regards as distinguishing the Applicant's gels from those of Bae, Bae explicitly agrees, describing his gels as collapsing, and therefore having substantial synerisis. Given that Bae never teaches a gel having the functional properties claimed by the Applicant, and in fact teaches directly away from the functional property used by the Applicant to limit the Applicant's claims, Bae cannot possibly form the basis for anticipation under 35 USC 102 or obviousness under 35 USC 103.

The Examiner has persisted in rejected claims 1-12 and 31-36 under 35 USC 102(b) as being anticipated by, or in the alternative, under 35 USC 103(a) as obvious over Hoffman et al. (USP 5,998,588). In making this rejection, the

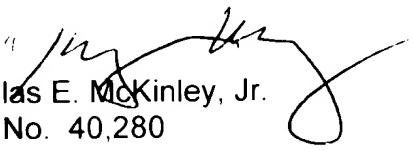
Examiner has ignored the disclosure of Hoffman as it relates to the presently claimed invention. Specifically, Hoffman shows that the NIPAAm in Hoffman's system has a molecular weight of between 1,000 and 25,000 to 30,000, well outside of the Applicant's claimed range which excludes copolymer chains or polymer chains having molecular weights less than the minimum geling molecular weight cutoff. Plainly, these oligomers taught by Hoffman include short chain, low molecular weight species that behave differently; specifically, these species will not undergo a sol-gel transition. Not surprisingly, Hoffman never shows any sol-gel transition. How does the Examiner attempt to overcome this obvious deficiency? In his prior office action, the Examiner asserts that the material is "purified" by GPC at column 32 lines 31-34 and therefore "contains no low molecular weight material." Actually, the GPC method is used by Hoffman to characterize composition, not purify the materials, see line 31 (Characterization....). As used in Hoffman, it is the analytical not preparative chromatography. See line 28 for description of purification: the material was purified by precipitation of conjugated protein and un-conjugated NiPAAm polymer. It is obvious from this description that the precipitate contained both species, the polymer/protein conjugate and the un-conjugated polymer. With this method of purification Hoffman was seeking only to eliminate the un-conjugated protein. In fact, at the end of Hoffman's GPC column is a protein/polymer conjugate, the precise material Hoffman sought to fabricate, which is entirely distinct from the Applicant's claimed composition of matter. The Applicant has no protein polymer conjugate.

Based on the description of the purification method (column 32, lines 28-31) one may conclude that Hoffman's material does not gel. If gel formation would occur, separation of streptavidin would not be possible. The streptavidin would remain entrapped within the gel. However, as described (column 32, lines 28-34), Hoffman was able to separate the soluble streptavidin from the precipitate that contained the conjugated protein and un-conjugated NiPAAm.

Closure

Applicant has made an earnest attempt to place the above-referenced application in condition for allowance and action toward that end is respectfully requested. In the alternative, the Applicant respectfully requests that the Examiner enter the foregoing amendments to place the Application in better form for appeal. Should the Examiner have any further observations or comments, he is invited to contact the undersigned for resolution.

Respectfully submitted,



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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Gutowska	Art Unit: 1711
Serial No: 09/209,541	Examiner: Jeffrey Mullis
Filed: 12/11/98	Paper No: 11
For: REVERSIBLE GELING CO-POLYMER AND METHOD OF MAKING	File No: E-1537-CIP
	Date: August 21, 2001

Box Patent Application
Assistant Commissioner for Patents
Washington, D.C. 20231

Version of Amended Claims to Show Changes Made

Claims 1 and 31 were amended as follows where underlined matter was inserted and {bracketed} matter deleted:

1. (twice amended) A therapeutic agent carrier, comprising:
   a. a reversible geling copolymer, having a linear random copolymer of:
      i. an N-alkyl substituted [meth-]acrylamide derivitive; and
      ii. a hydrophilic comonomer, wherein an amount of said hydrophilic comonomer in the linear random copolymer is less than about 10 mole% and greater than or equal to about 1 mole% wherein gelation occurs upon heating and with substantially no synerisis, said linear random copolymer in the form of a plurality of linear chains having a plurality of molecular weights greater than or equal to a minimum geling molecular weight cutoff, and excluding a substantial amount

of copolymer chains or polymer chains having molecular weights less than the minimum geling molecular weight cutoff;

b. an aqueous solvent mixed with said reversible geling copolymer as a reversible geling solution; and

c. a therapeutic agent mixed with said reversible geling solution as said therapeutic agent carrier.